Published as: Brown, G. D. A., & Gathergood, J. (in press). Consumption changes, not income changes, predict changes in subjective well-being. *Social Psychological and Personality Science.*

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Acknowledgements: This study was supported by the Economic and Social Research Council (U.K.) [grant numbers ES/K002201/1 and ES/P008976/1], the Leverhulme Trust [grant number RP2012-V-022] and the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 788826). We thank Andrew Oswald for helpful comments.

Abstract

Does happiness depend on what one earns or what one spends? Income is typically found to have small beneficial effects on well-being. However, economic theory suggests that well-being is conferred not by income but by consumption (i.e., spending on goods and services), and a person's level of consumption may differ greatly from their level of income due to saving behavior and taxation. Moreover, research within consumer psychology has established relationships between people's spending in specific categories and their well-being. Here we show for the first time using panel data that changes in life satisfaction are associated with changes in consumption, not changes in income. We also find some evidence that increased conspicuous consumption is more strongly associated with improved well-being than is increased non-conspicuous consumption.

KEYWORDS: Income; consumption; conspicuous consumption; well-being; life satisfaction

Consumption Changes, Not Income Changes, Predict Changes in Subjective Well-being

To what extent, and under what circumstances, are consumers happier when they have more money? Much research into the relationship between economic circumstances and subjective well-being has focused on the relationship between income and life satisfaction. This strand of research has typically relied on the availability of large datasets to underpin the relevant econometric analyses. It is usually found that income has a small beneficial effect on the life satisfaction of people within a country at a given time, although effects of changing GDP within countries over time are smaller or absent and effects of income on affective well-being are sometimes smaller than effects on more cognitive/evaluative measures (Diener & Seligman, 2004; Kahneman & Deaton, 2010; Stevenson & Wolfers, 2013).

While a strength of many of these studies is their use of large (and sometimes panel) datasets, a major limitation is their focus on income rather than (or as well as) consumption. The distinction matters both because of the difference between income and consumption and in the light of a large body of work in consumer psychology concerning the effects of different categories of consumption on well-being. Consumption is correlated with income, but at any given point in time a person's consumption level may differ greatly from their income level due to saving behavior and taxation (Attanasio & Pistaferri, 2016; Meghir & Pistaferri, 2011). Income may under-predict consumption (e.g., for poor households that receive food stamps, or for households that borrow money to spend) or over-predict consumption (e.g., for wealthier households, which typically save more). In Figure 1 we show that income and consumption differ substantially among the sample of US households that we describe below. This difference confirms that current income alone is a poor proxy for consumption of goods and services. In this paper we therefore ask whether well-being is predicted by consumption, income, or both.

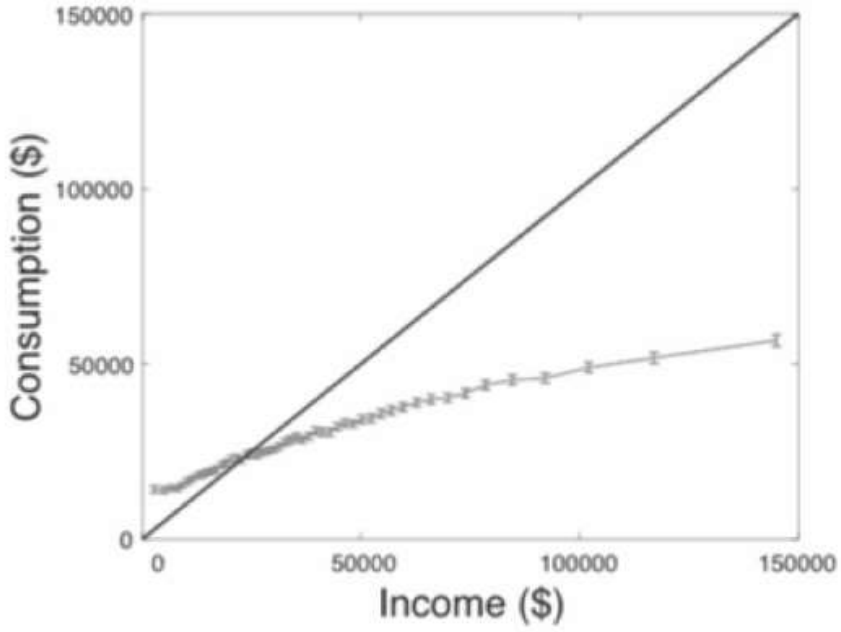

Figure 1. Relation between income and consumption. Data are from the Panel Study of Income Dynamics; see Supplementary Material available online for details. Income data sorted into 50 equally sized bins; points represent mean income and mean consumption within each bin. Error bars show 95% confidence intervals.

The focus on income, rather than consumption, in econometric analyses of panel data reflects the lack of available datasets. The few previous large dataset studies of consumption and general well-being (DeLeire & Kalil, 2010; Headey, Muffels, & Wooden, 2008; Hudders & Pandelaere, 2012; Noll & Weick, 2015) have mostly been cross-sectional and hence unable to control for the effects on general well-being of stable but unobservable or unobserved

individual differences (e.g., in personality)[1]. Moreover, previous studies have typically had only partial consumption data available. Here in contrast we make use of a large dataset, the Panel Study of Income Dynamics (PSID) which has complete consumption data (broken down into categories) for individuals who are tested repeatedly. We exploit the panel structure of the data to compare the effects of income changes and consumption changes as predictors of changes in people's life satisfaction.

Income might plausibly influence well-being even when conventional categories of consumption are accounted for, perhaps because of savings or feelings of future security. However the need to focus on the effects of consumption as well as of income on well-being is confirmed by research (from both economics and psychology) that has focused on different subcategories of consumption. Research in consumer psychology has typically focused on the distinction between experiential and material consumption, research in social psychology has examined effects of prosocial spending, and economic studies have placed more emphasis on differential effects of conspicuous and non-conspicuous consumption.

Thus one suggestion is that only expenditure on experiential, rather than material, goods leads to increased well-being (Gilovich & Kumar, 2015; Guevarra & Howell, 2015; Van Boven & Gilovich, 2003) (although see Schmitt, Brakus, & Zarantonello, 2015). Thinking about past experiential purchases improves mood more than does thinking about past material purchases, experiences enter more strongly than do material items into people's self-narratives (Carter & Gilovich, 2012), and people are relatively more willing to wait for experiences than for possessions (Kumar & Gilovich, 2016). Most of this research is laboratory-based and examines

[1] Headey et al. (2008) report a fixed effects analysis of satisfaction with standard of living, using partial consumption data and finding a positive effect of consumption in British data but a negative effect in Hungarian data.

the changes in affect associated with particular expenditures rather than the effect of general consumption levels on a more cognitive/reflective measure of overall satisfaction with life, although DeLeire and Kalil (2010) found, in analysis of a large dataset, that amongst older Americans only leisure consumption was substantially and significantly related to life satisfaction. DeLeire and Kalil also find a small positive effect of spending on charity and gifts. Consistent with the latter finding, a third line of research has found positive effects of prosocial spending on well-being (e.g., Dunn, Aknin, & Norton, 2008; Goodman, Lim, & Meyvis, 2017; Whillans, Dunn, Sandstrom, Dickerson, & Madden, 2016).

Research within economics has in contrast emphasized the role of conspicuous or positional consumption in conferring status-related utility (Frank, 2010; Saad, 2011; Veblen, 1899), consistent with a large body of research suggesting that the desire for status is a basic human concern (Anderson, Hildreth, & Howland, 2015). Some correlational evidence is consistent with a link between well-being and conspicuous consumption (Hudders & Pandelaere, 2012, 2015; Masferrer-Dodas, Rico-Garcia, Huanca, Reyes-Garcia, & Team, 2012). While the literature on income and positional consumption differs from much research in consumer psychology in the well-being measures that are typically used (i.e., often using measures of cognitive/reflective rather than affective well-being), as well as in the manner in which overall consumption is subdivided, it is possible that "experiential consumption" and "conspicuous consumption" are at least partially overlapping categories. We return to this issue below.

Here we address these issues in a novel way by making use of the PSID. This brings two key advantages. First, use of panel data (in which the same individuals are surveyed on more than one occasion) enables us to examine whether within-individual changes in economic circumstances (whether of income or consumption) are associated with within-individual changes in well-being, thereby allowing a stronger test of possible associations than is

achievable using cross-sectional data alone. Most previous results have not only been confined to the study of income rather than consumption, but also have been cross-sectional (for exceptions, see e.g. Cheng, Powdthavee, & Oswald, 2015; Hounkpatin, Wood, Brown, & Dunn, 2015). Second, complete consumption data are available for individuals, broken down by categories. This not only enables a more global examination of the effects of consumption on well-being than is typical in the consumer psychology literature (in our dataset only about 5% of consumption expenditure is on vacations and hobbies, which are the categories closest to "experiential" consumption), but allows us to look at sub-categories of consumption. We first ask whether it is income, or consumption, that affect overall satisfaction with life. Income can, after all, be allocated to material, experiential, or prosocial spending at the recipient's discretion. Taking an exploratory approach, we then look at possible differential effects of different categories of consumption on well-being with a particular focus on the distinction between conspicuous and non-conspicuous consumption.

Throughout, we focus on "fixed effects" analyses which exploit the panel structure of the data and focus on within-individual changes in the variables of interest.[2] While the results from conventional cross-sectional regression analyses allow comparison of the effects of consumption (and its subcategories) with the effects of income *across* individuals, such analyses are limited in that they are susceptible to third-variable problems – there might be some unmeasured individual characteristic (such as personality) which is correlated with both well-being and spending behavior. The fixed effects analyses examine whether within-individual changes over time in one variable (e.g., consumption) can predict within-individual

[2] The term "fixed effects" is used in a number of different ways in different literatures (see, e.g., Gelman, 2005). Our usage is most common in econometrics, and refers to estimating a different intercept for each individual (see Equation 1 below).

changes in the outcome variable (well-being) after controlling for changes in other predictors. The analyses therefore effectively control for the effects of unobservable but relatively stable individual differences (e.g., in personality, although see Boyce, Wood, & Powdthavee, 2013; Luhmann, Orth, Specht, Kandler, & Lucas, 2014) that might otherwise represent confounds. Although the results from fixed effects analyses cannot exclude the possibility that some causally relevant unobserved variable is changing over time within individuals, and are informative solely about within-individuals effects, the fixed effects analyses represent a more conservative approach than conventional cross-sectional regression. At the same time, these analyses address different theoretical questions to those addressed by cross-sectional analyses, and the fixed effects results that we report below cannot support claims about between-individual relationships.

Analysis 1: Does income or consumption affect well-being?

Our first analysis examines whether income or consumption influences subjective well-being. The PSID provides detailed consumption data on household expenditures in 34 categories as well as a measure of well-being and various control variables (Andreski, Li, Samancioglu, & Schoeni, 2014).

Method

Our use of the PSID is motivated by the fact that, our knowledge, it is the only large scale household panel survey that includes both measures of life satisfaction and detailed consumption data. Full details of participants, data collection methods, and measures used in the survey are available at psidonline.isr.umich.edu/Guide/documents.aspx. We use the three most recently available waves — 2009, 2011 and 2013 — which include information on life satisfaction and consumption for approximately 8,000 households per wave. From 2009 the

PSID has included a standard self-reported life satisfaction question phrased as follows: '*Please think about your life as a whole. How satisfied are you with it? Are you completely satisfied, very satisfied, somewhat satisfied, not very satisfied, or not at all satisfied?*' This question is asked only of the main respondent, who also answers the household questionnaire. Consequently, we use data on only one respondent per household. Our sample is therefore not fully representative of the US adult population as it under-represents second and third adult members of household units (typically spouses), with 74% of the respondents in our sample being male. We restrict the sample to a balanced panel of households. We decided ahead of time to omit observations which fall into the top 1% or bottom 1% of the distribution of consumption or income, as there are typically extreme outliers (e.g., one or two incomes in the millions of dollars, or reports of negative income and/or consumption) and hence such omission is standard practice in econometric analyses.[3]

This left us with 16,992 observations for 5,664 individuals. Sample size was therefore determined entirely by the nature of the sample available to us along with the above-mentioned exclusionary criteria; no stopping rule was applied in our analyses. The STATA scripts used to conduct the analyses are available in the online Supplementary Material. We have reported the results of all analyses that were undertaken,

Summary data for demographics, socio-economic controls and the measure of life satisfaction for the three waves of data pooled together are shown in the Supplementary Material available online (Table S1). Among the balanced panel of individual-year observations 74% are for male individuals, with an average age of 46. Approximately half of the sample are married or have a partner, two-thirds have high school education or higher, more

[3] We nonetheless repeated all analyses without the exclusions at the request of a referee and results were qualitatively unchanged.

than two-thirds are employed and a little over 60% own their home. Average self-reported health is 3.5 (mid-way between 'good' and 'very good'), and the mean score on the Kessler mental anxiety scale is 3.8 out of a possible 24. The average value of life satisfaction is 3.8, with a standard deviation of 0.83. Equivalized total consumption (i.e. consumption per household member) and consumption by main PSID category are summarized in Table S2 in the Supplementary Material. The PSID consumption data are consistent with more detailed consumption data in the Consumer Expenditure Survey. The table reports the unconditional means and standard deviation (i.e. including zero values), hence the individual row means sum to the mean of total consumption. The largest single consumption category is housing (36% of total expenditure), followed by transport (19%) and food (15%). Summary data for the sub-categories which together comprise these main categories are shown in the online Supplementary Material (Tables S3 and S4).

Results

Our main analysis estimates the following equation:

$$LS_{i,s,t} = \beta_1 \log(C)_{i,s,t} + \beta_2 \log(Y)_{i,s,t} + \beta_3 \mathrm{X}_{i,s,t} + \theta_i + \mu_s + \varphi_t + \epsilon_{i,s,t} \qquad (1)$$

where individual i lives in state s in time period, t, log(C) is the natural log of total equivalized annual consumption, log(Y) is the natural log of equivalized annual income, X is a vector of time-varying demographic and socio-economic controls and $\theta, \mu,$ and φ are individual, state and time fixed effects. The time dimension of our data covers three waves: 2009, 2011 and 2013. In our baseline specification, consumption and income enter as their natural logs. To ensure robustness, we also estimate models in which consumption and income enter in levels ($ values) and compare results.

As the majority of our analyses used the fixed effects method, in the Supplementary Material we report overall between-subjects and within-subjects standard deviations for our main variables (consumption and income: Table S5), main consumption categories (Table S6), and socio-economic covariates (Table S7).

Our main econometric model regresses life-satisfaction (on a 5-point scale) against the natural log of equivalized household consumption; the natural log of equivalized household income; individual, geographic state of residence and time fixed effects, and controls. The key coefficients are shown in Figure 2A, with full results in Table 1.

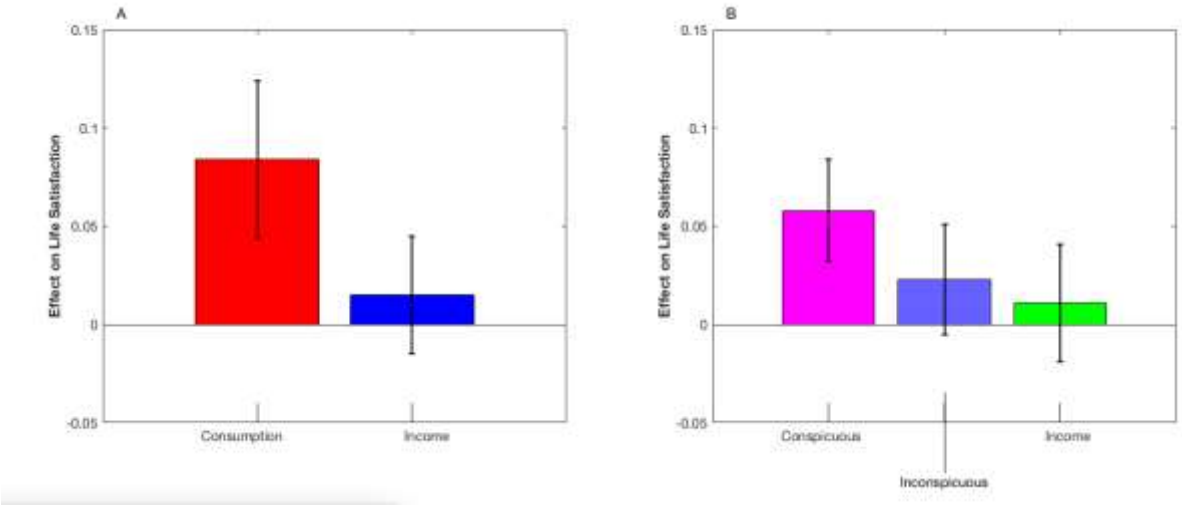

Figure 2. Coefficients predicting life satisfaction from income and consumption**.** Data are from the Panel Study of Income Dynamics. A: Coefficients on log(overall consumption) and log(income). B: Coefficients on log(conspicuous consumption), log(inconspicuous consumption) and log(income). All coefficients are from regressions that include controls. Error bars show 95% confidence intervals.

In Columns 1 and 2 of Table 1 we show univariate models (i.e. without any controls or fixed effects) in which life satisfaction is regressed against log income (Column 1) and log consumption (Column 2) for the most recent (2013) wave of data.[4] The variance inflation factors were 1.03 (life satisfaction), 1.88 (log consumption), and 1.89 (log income), indicating acceptable levels of collinearity. We then turn to the main analyses and include individual fixed effects in Columns 3 and 4,

[4] Pooled analyses were also undertaken, and showed similar results.

Table 1: Main regression estimates, log specification. Table reports regression estimates [95% Cis] for the balanced PSID panel 2009-2013. Columns 1 and 2 are pooled cross-section regressions for the year 2013; Columns 3 - 7 include individual fixed effects. Education refers to highest educational qualification obtained by the respondent. Employment refers to current employment status. Self-reported health question in full is: `Would you say your health in general is excellent, very good, good, fair, or poor?' We code excellent = 5, poor = 1. Mental Anxiety Scale is derived from responses to the Kessler-6 non-specific psychological distress scale.

	(1) Pooled	(2) Pooled	(3) Fixed Effects	(4) Fixed Effects	(5) Fixed Effects	(6) Fixed Effects	(7) Fixed Effects
Log Consumption		0.219		0.103	0.098	0.083	0.084
		[0.179,0.259]		[0.065,0.140]	[0.059,0.137]	[0.043,0.122]	[0.045,0.124]
Log Income	0.179		0.033		0.018	0.009	0.015
	[0.152,0.205]		[0.004,0.062]		[-0.012,0.047]	[-0.021,0.039]	[-0.015,0.045]
Age						0.027	-0.029
						[-0.026,0.080]	[-0.097,0.040]
Age Squared						-0.000	0.000
						[-0.001,0.001]	[-0.001,0.001]
Age Cubed						0.000	-0.000
						[-0.000,0.000]	[-0.000,0.000]
Married / Partner (= 1)						0.103	0.094
						[-0.012,0.218]	[-0.021,0.209]
Widowed (= 1)						0.105	0.071
						[-0.142,0.352]	[-0.177,0.319]
Divorced (= 1)						0.015	-0.004
						[-0.133,0.163]	[-0.152,0.145]
Separated (= 1)						-0.230	-0.239
						[-0.385,-0.076]	[-0.393,-0.085]
No. Dependent Children						0.037	0.041

						[0.011,0.063]	[0.015,0.067]
Highschool Graduate (= 1)						0.109	0.096
						[0.001,0.217]	[-0.012,0.205]
College graduate (= 1)						0.048	0.059
						[-0.078,0.174]	[-0.068,0.185]
GED (= 1)						0.050	0.036
						[-0.177,0.276]	[-0.190,0.263]
Employed (= 1)						0.006	0.003
						[-0.047,0.059]	[-0.050,0.056]
Unemployed (= 1)						-0.154	-0.158
						[-0.221,-0.088]	[-0.224,-0.092]
Temp. Non-Working (= 1)						-0.036	-0.035
						[-0.201,0.130]	[-0.201,0.131]
Owns Home (=1)						0.046	0.041
						[-0.038,0.130]	[-0.043,0.126]
Rents Home (=1)						0.036	0.033
						[-0.039,0.112]	[-0.043,0.108]
Self-Reported Health (1-5)						0.090	0.089
						[0.072,0.108]	[0.070,0.107]
Mental Anxiety Scale						-0.017	-0.021
						[-0.021,-0.013]	[-0.025,-0.017]
Observations	16992	16992	16992	16992	16992	16992	16992
State Fixed Effects	No	No	No	No	No	No	Yes
Year Fixed Effects	No	No	No	No	No	No	Yes

where it is evident that the magnitude of the coefficient on log consumption reduces by a half and the coefficient on log income reduces to only one fifth of its previous magnitude. These results confirm that controlling for individual level heterogeneity is very important in life satisfaction estimates. When we include both log consumption and log income together (Column 5) we find that the coefficient on log consumption is estimated to be greater than zero, whereas the coefficient on log income is not. A t-test of equivalence confirms that the coefficients are statistically significantly different from one another (p =.0030). The coefficient on log consumption is five times larger than the coefficient on log income. With the addition of socio-economic and demographic controls (Column 6) the coefficient on log consumption falls slightly in magnitude but it increases very slightly when we add state of residence and year fixed effects (Column 7).

Thus, there is a positive effect of consumption upon life satisfaction ($\beta = 0.084$, 95% CI [0.045, 0.124]), but no evidence for an effect of income, in the most conservative analysis (Column 7). The coefficient estimates imply that the effect of an increase in consumption is at least five times as large as the effect of the same increase in income, when they are treated as independent: A one standard deviation increase in consumption leads to an increase in life satisfaction of approximately 5.2% of a standard deviation. We find very similar effects when estimating models in which income and consumption enter in levels, not log (see Table S8 in Supplementary Material for results).

Discussion

Our results show that consumption changes, not income changes, predict changes in life satisfaction. We note possible implications for public policy. There has been much recent interest in the possibility that public policy interventions and non-market goods might be

evaluated, at least in part, in terms of their effects on population well-being (Dolan & Kahneman, 2008; O'Donnell, Deaton, Durand, Halpern, & Layard, 2014). While previous studies use income-equivalents of well-being effects, our analysis suggests that the increases in consumption that would be required to compensate for the negative effect of specific life events on life satisfaction (consumption–equivalents) would differ.

Analysis 2: Effects of Different Categories of Consumption

The detailed consumption data available for this study allow us to examine the relationship between different types of consumption and life satisfaction, and we do this in Analysis 2. To our knowledge, ours is the first study to do so using detailed consumption microdata in a panel survey design.

In analyzing the effects of subcategories of consumption, we adopt a conservative approach. We first present results in a theory-neutral way by examining the effects of each major subcategory of consumption on well-being after controlling for income and other background variables. These analyses therefore make no assumption about the "correct" way to group consumption categories together, and we include all the code for analysis so that other researchers may construct their own groupings. However, given that there already exists a large prior literature suggesting that conspicuous consumption is an important category, we then take advantage of an independently-motivated categorization of consumption types as "conspicuous" and "non-conspicuous" to examine the differential relations of these subcategories of consumption to well-being.

Method

Table 2 shows the intercorrelation matrix between life satisfaction, income, total consumption, and all major categories of consumption as defined in the PSID.

Table 2: Correlations between life satisfaction, income, total consumption, and all major categories of consumption as defined in the PSID.

	Life Satisfaction	Income	Total Cons	Food	Housing	Utilities	Transport
Life Satisfaction	1						
Income	0.151	1					
Total Consumption	0.123	0.645	1				
Food	0.0877	0.406	0.552	1			
Housing	0.0838	0.558	0.788	0.337	1		
Utilities	0.0454	0.172	0.361	0.160	0.366	1	
Transport	0.0580	0.300	0.568	0.209	0.209	0.106	1
School	0.0388	0.166	0.321	0.101	0.106	0.0214	0.0672
Childcare	0.0424	0.0958	0.133	0.0217	0.0695	-0.0221	0.0268
Healthcare	0.0546	0.276	0.402	0.203	0.180	0.119	0.140
Home Repairs	0.0544	0.212	0.435	0.126	0.361	0.129	0.0736
Home Furnishings	0.0395	0.199	0.358	0.151	0.286	0.0595	0.0936
Clothing	0.0277	0.219	0.329	0.191	0.180	0.0409	0.106
Holidays	0.117	0.397	0.439	0.261	0.261	0.0841	0.129
Hobbies	0.0398	0.257	0.313	0.199	0.172	0.00672	0.0971

We first report the coefficients relating each PSID category of consumption to life satisfaction, using the fixed effects specification and all the controls (income and socio-demographic variables) used in the analyses reported above. Our aim here is to present an exploratory and "theory neutral" analysis prior to exploiting an independently-developed classification of consumption categories as "conspicuous" or "non-conspicuous". The results can be seen in Table 3, where it is evident that there are effects of spending in a number of different consumption categories.

Table 3. Coefficients relating each PSID category of consumption to life satisfaction, using the fixed effects specification and all controls.

	Coefficients	Observations
Log Food	0.030	16871
	[0.006,0.054]	
Log Housing	0.084	16898
	[0.051,0.116]	
Log Utilities	.019	15959
	[-0.009,0.047]	
Log Transport	0.008	16471
	[-0.008,0.023]	
Log School	-0.001	4914
	[-0.020,0.019]	
Log Childcare	0.002	2339
	[-0.036,0.041]	
Log Healthcare	0.005	15190
	[-0.006,0.016]	
Log Home Repairs	0.013	9495
	[-0.000,0.025]	
Log Home Furnishings	0.006	10903
	[-0.008,0.019]	
Log Clothing	0.014	16197
	[-0.001,0.029]	
Log Trips and Vacations	0.009	11212
	[-0.008,0.026]	
Log Other Recreation	0.014	13822
	[-0.000,0.028]	

For a more theory-driven analysis of conspicuous consumption, we assign each sub-category as ‘conspicuous’ or ‘non-conspicuous’. We draw on data constructed by Heffetz (2011) who commissioned a survey of a representative sample of US consumers who were asked to evaluate the visibility of different consumption types. Respondents to the survey were asked to evaluate 31 consumption categories with results indicating cigarettes to be most visible category of expenditure and, perhaps unsurprisingly, underwear to be the least visible category. The author uses those data to predict how consumption in different categories changes as a function of income (i.e., income elasticities), finding that consumption increases more with

income when the consumption is more visible. This result is consistent with a model in which consumers gain additional utility from consumption which is conspicuous. In our baseline classification, we mapped all the PSID expenditure categories to the Heffetz classification, and classified as "conspicuous" all and only all the PSID categories that appeared in the top half of the ranking reported by Heffetz (2011). These were: food away from home, clothing, holidays, recreation / hobbies and expenditure on telephones.

In additional classifications, we examine the sensitivity of results to including home furnishings and schooling as 'conspicuous' (see below, and Supplementary Material). Depending upon which classification we use, the share of conspicuous consumption among the PSID sample ranges at the mean between one quarter to one third of total consumption.

Result

Table 4 presents estimates in which the natural log of total conspicuous and non-conspicuous consumption enter into the econometric specification separately. The striking result in Column 1 is that, when we include both conspicuous and non-conspicuous consumption in the same specification, only the coefficient on conspicuous consumption is estimated to be different from zero, although a t-test of equivalence found that the coefficients were not statistically significantly different from one another at the conventional level (p = 0.1050). Columns 2 and 3 show that, even when the variables are entered separately, the coefficient on non-conspicuous consumption is half the magnitude of that on conspicuous consumption. As a sensitivity test, we also estimate the same model specifications, but with

Table 4: Conspicuous and non-conspicuous consumption, log specification. Table reports individual fixed effects regression estimates (SEs) for balanced PSID panel 2009 -2013. For categorization of consumption components into 'conspicuous' and 'non-conspicuous' consumption groups see main text. Education refers to highest educational qualification obtained by the respondent. Employment refers to current employment status. Self-reported health question in full is: `Would you say your health in general is excellent, very good, good,

fair, or poor?' We code excellent = 5, poor = 1. Mental Anxiety Scale is derived from responses to the Kessler-6 non-specific psychological distress scale. Control variables not shown: housing tenure dummies.

	(1) Fixed Effects	(2) Fixed Effects	(3) Fixed Effects
Log Conspicuous Consump.	0.058	0.061	
	[0.031,0.084]	[0.035,0.087]	
Log Non-Conspic. Consump.	0.023		0.033
	[-0.005,0.051]		[0.005,0.061]
Log Income	0.011	0.014	0.020
	[-0.019,0.041]	[-0.015,0.044]	[-0.010,0.050]
Age	-0.026	-0.025	-0.026
	[-0.094,0.042]	[-0.093,0.044]	[-0.094,0.043]
Age Squared	-0.000	-0.000	-0.000
	[-0.001,0.001]	[-0.001,0.001]	[-0.001,0.001]
Age Cubed	-0.000	-0.000	-0.000
	[-0.000,0.000]	[-0.000,0.000]	[-0.000,0.000]
Married/Partner (= 1)	0.093	0.093	0.092
	[-0.022,0.208]	[-0.022,0.208]	[-0.022,0.207]
Widowed (= 1)	0.065	0.067	0.071
	[-0.183,0.313]	[-0.181,0.315]	[-0.177,0.319]
Divorced (= 1)	-0.006	-0.006	-0.005
	[-0.154,0.142]	[-0.154,0.142]	[-0.153,0.144]
Separated (= 1)	-0.240	-0.239	-0.238
	[-0.394,-0.085]	[-0.394,-0.085]	[-0.392,-0.084]
No. Dependent Children	0.041	0.040	0.036
	[0.015,0.067]	[0.014,0.066]	[0.010,0.062]
Highschool Graduate (= 1)	0.098	0.099	0.097
	[-0.010,0.207]	[-0.010,0.207]	[-0.012,0.205]
College graduate (= 1)	0.058	0.060	0.060
	[-0.068,0.185]	[-0.067,0.186]	[-0.066,0.187]
GED (= 1)	0.038	0.036	0.033
	[-0.188,0.265]	[-0.190,0.262]	[-0.194,0.259]
Employed (= 1)	0.002	0.003	0.004
	[-0.051,0.055]	[-0.050,0.056]	[-0.049,0.057]
Unemployed (= 1)	-0.158	-0.159	-0.159
	[-0.224,-0.092]	[-0.225,-0.093]	[-0.226,-0.093]
Temp. Non-Working (= 1)	-0.032	-0.030	-0.033
	[-0.198,0.134]	[-0.196,0.136]	[-0.199,0.133]
Self-Reported Health (1-5)	0.088	0.088	0.089
	[0.070,0.107]	[0.069,0.106]	[0.071,0.107]
Mental Anxiety Scale	-0.021	-0.021	-0.021

	[-0.025,-0.017]	[-0.025,-0.017]	[-0.025,-0.017]
Observations	16992	16992	16992

consumption and income entering in levels (in units of ten thousand dollars), not log values (see Table S9 in online Supplementary Material for results). The pattern in the coefficient estimates is very similar to that in Table 4, with the exception that the estimate of the coefficient of non-conspicuous consumption is not estimated to be different from zero in either specification in which it enters and a t-test of equivalence confirms that the difference between the coefficients approached the conventional level of statistical significance (p = 0.051). In further sensitivity tests we i) excluded the measure of psychological anxiety from the specification and also ii) excluded the measure of income from the specification. In both cases results are unchanged.

As a sensitivity test, we change classifications of sub-categories of consumption across groups. We see very similar results to those in the main tables (see Table S10 in Supplementary Material for full results). When we include home furnishings in the conspicuous category, the coefficient on the conspicuous consumption variable falls in magnitude and the coefficient on the non-conspicuous consumption variable increases in magnitude. The same occurs to a lesser extent when we also include school expenses in the conspicuous category. In both joint specifications the coefficient on conspicuous consumption is more precisely estimated and larger in magnitude than the coefficient on the non-conspicuous consumption variable.

Next, we note that it has recently been argued that the effects of income on well-being reflect social comparison processes, and that is the relative rank of a person's income within a comparison group, rather than income per se, that is positively associated with well-being (e.g., Boyce, Brown, & Moore, 2010; Hounkpatin et al., 2015). An obvious question is whether the

same is true for consumption. With the data we use here it is not possible to distinguish between these possibilities, because the correlations between consumption and consumption rank are very high. For example, rank of overall consumption is correlated .978 with log overall consumption, and .938 with overall consumption level. For conspicuous consumption, the correlations are .964 and .836 respectively. Although it may be possible to separate rank effects and level effects by making use of different assumed comparison groups, such analyses fall outside the scope of the present investigation.

Finally, we returned to the issue of whether the relevant categorization of consumption, for the purposes of predicting life satisfaction, is conspicuous vs. non-conspicuous or experiential vs. non-experiential. Experiential purchases such as vacations are often social and highly visible, likely to be mentioned on social media, and the well-being benefit associated with experiential goods is diminished if people are forbidden from talking about them (Kumar & Gilovich, 2015). Set against this, it has been suggested that the beneficial effect on well-being of experiential rather than material consumption reflects the fact that social comparison is easier for material goods (Howell & Hill, 2009; Van Boven, 2005).

We do not have data on the purchasing intentions of our participants, so any analysis must be tentative. However two of the sub-categories of consumption in our dataset appear to be relatively unambiguously classifiable as experiential — expenditure on trips and vacations, and expenditure on hobbies/recreation. We therefore calculated, for each individual, (a) consumption falling within these two categories, which we label "experiential", and (b) all remaining consumption ("non-experiential"). We then conducted fixed effect analyses paralleling those reported above for conspicuous and non-conspicuous consumption, and the results are reported in Tables S11 (log specification) and S12 (level specification) in Supplementary Material. Results were not conclusive in either case; Table S11 reveals

coefficients of similar magnitudes for experiential and non-experiential consumption when the two categories were entered simultaneously and we cannot reject the null hypothesis of equivalence of coefficients (p = 0.775), although the coefficient on non-experiential consumption only just failed to reach significance at the conventional level, and both predicted life satisfaction when entered separately (columns 2 and 3). Table S12 reveals a fairly similar pattern, although when the two categories are entered simultaneously the difference between coefficients was marginally significant (p = 0.08). Estimates are evidently sensitive to model specification, so we consider these results to be inconclusive as to the effects of experiential and non-experiential consumption on life satisfaction.

General Discussion

Ours is the first study to use large-scale longitudinal household panel microdata with comprehensive consumption data to address the relationship between consumption and well-being. Our findings demonstrate the importance of using consumption, as opposed to income, to estimate the effects of economic resources upon well-being and in the use of such effects to value non-market goods. Our use of a panel design (fixed-effects specification) goes some way towards ruling out the possibility that our results reflect time-invariant confounding individual differences like personality (e.g., individuals high in extraversion might both consume more and experience higher well-being), although the possible existence of an unknown and causally relevant third variable cannot be ruled out.

Our study relates to a large existing literature in both economics and psychology. It has often been suggested that increased spending may actually reduce well-being (Frank, 2004; Scitovsky, 1976) and, empirically, materialistic attitudes are associated with reduced well-being on a number of dimensions (Kashdan & Breen, 2007; Kasser, 2002). Our results speak against the idea that one important component of well-being, life satisfaction, is reduced by

increased spending but they leave open the possibility that more affect-related aspects of well-being might be negatively influenced.

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